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DUMONT®

OSCILLOSCOPE CAMERA

TYPE 353

Allen B. DuMont Laboratories, Inc.
INSTRUMENT DIVISION
760 BLOOMFIELD AVENUE, CLIFTON, N. J., U. S. A.

Manual No. 6703 5721

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TYPE 353

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ADDENDUM

FOR INSTRUCTION MANUAL OF

TYPE 353 Oscilloscope Camera (Manual #6703 5721)

The changes described below were made in order to advise the operator of the critical focusing conditions that exist with the lens at full aperture.

Focusing of the Type 353 Oscilloscope Camera is very critical when using the f/1.9 lens at full aperture. Under these conditions the image will not focus over the entire picture. As a result, the camera is initially set to be in focus over a circle of two-inch diameter. Areas inside and outside of this circle will be out of focus to a greater or lesser extent, depending upon the distance from the two-inch diameter circle. Thus, when using cameras equipped with the f/1.9 lens, it is recommended that the aperture be kept as small as possible in order to obtain the best over-all focus.

ALLEN B. DU MONT LABORATORIES INC.
INSTRUMENT DIVISION
760 BLOOMFIELD AVENUE, CLIFTON, NEW JERSEY

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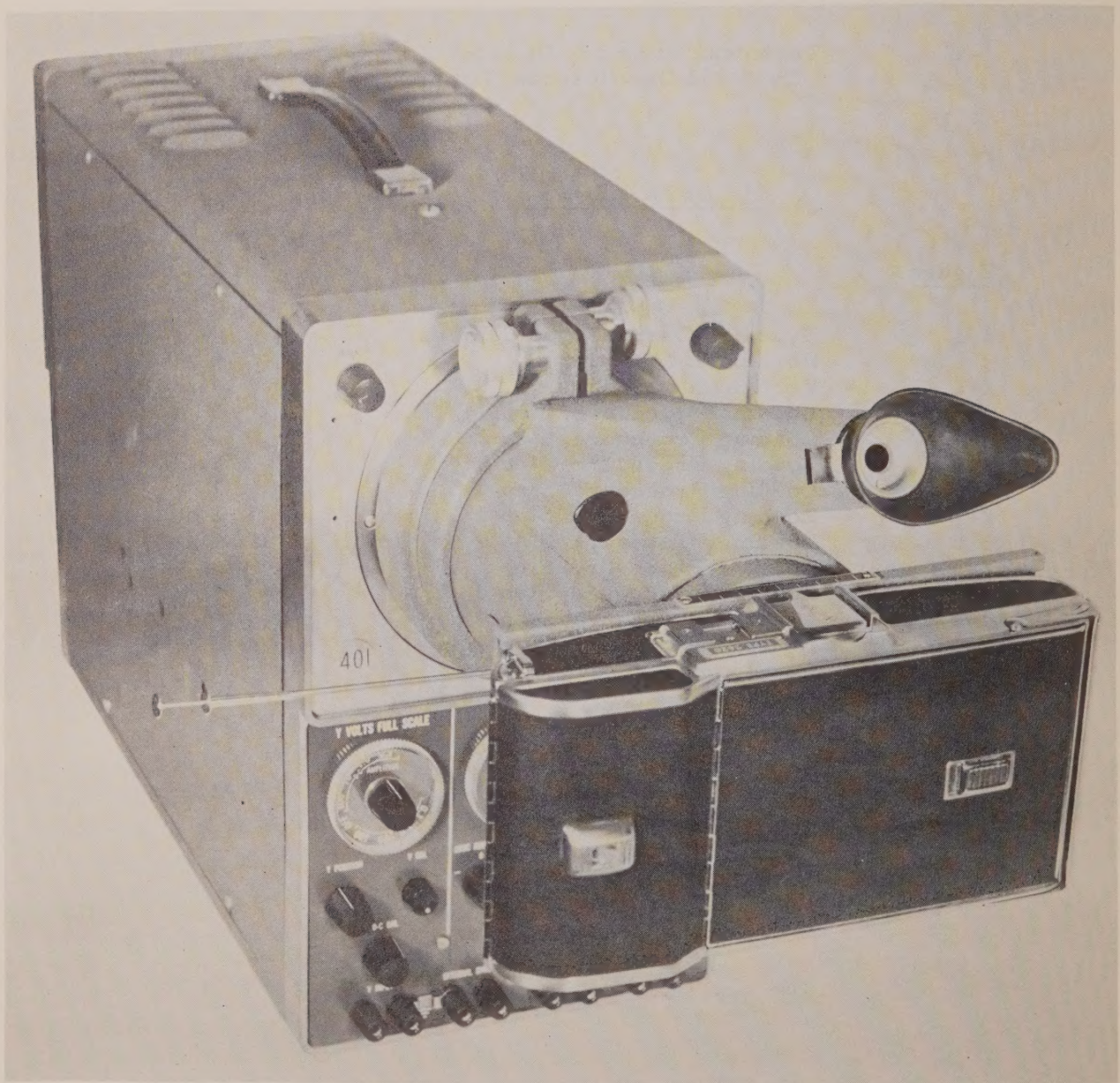


FIGURE I-1. TYPE 353 OSCILLOSCOPE CAMERA

SECTION 1

TECHNICAL SUMMARY

1-1. PURPOSE

The Du Mont Type 353 Oscilloscope Camera is designed for photographing on Polaroid-type film the images obtained from the face of 5-inch cathode-ray tubes.

1-2. FEATURES

- Simple to operate, easy to mount.

  Uses Polaroid Land Model 95 camera back in sliding adapter.

- Self-developing magazine.

- Delivers permanent print in 60 seconds or Polaroid positive transparency in 120 seconds.

- Can record several exposures on a single print.

- Camera can be adapted to use size 120 roll film or 2-1/4 by 3-1/4-inch cut film by using the accessories listed in this manual.

- Direct recording at 1:1 object to image ratio.

- Uses either the f/1.9 or the f/2.8 75-mm coated lens (depending on sales order).

- Simultaneous picture taking and viewing by means of peep hole in lens access door.

1-3. GENERAL

The camera consists of a cylindrical housing equipped with a clamp ring for mounting to the oscilloscope, a combined viewing tube and access door, and the Polaroid camera back.

The Polaroid camera back is mounted at the end of the housing by means of a sliding adapter that permits the back to be moved, allowing several oscilloscope traces to be photographed on the same film frame.

To view the oscilloscope trace without removing the camera assembly, a monocular viewing tube is mounted on the top of the housing. The viewing tube is combined with an access door that can be swung up out of the way for service or lens adjustment inside the housing.

For recording the cathode-ray tube patterns conveniently, the Type 353 Oscilloscope Camera is equipped with a Polaroid camera film mechanism. The film listed in Table 1-1 yields 8 frames per roll, although more than one oscilloscope trace can be photographed on each frame as will be described in this Manual. The Polaroid film feature allows for instant yet permanent prints for quick observation and future reference.

The exposure time required for a photographic record of an oscilloscope trace is dependent on the particular instrument used, its intensity, and trace characteristics. In general, the typical writing rate capability using light presensitized film is about 18 inches per microsecond: with a P11 screen on a cathode-ray tube at an accelerating potential of 6000 volts and Polaroid #44 or 46L film at f/1.9. With Polaroid #41 or 42 film under the same conditions, the writing rate is about 3 inches per microsecond.

1-4. TECHNICAL SUMMARY

Table 1-1 lists the essential characteristics of the Type 353 Oscilloscope Camera.

TABLE 1-1

TECHNICAL SUMMARY

DU MONT TYPE 353 OSCILLOSCOPE CAMERA

1.	CAMERA	A specially adapted Polaroid-Land Model 95 camera for attachment to 5-inch oscilloscopes.
2.	CAMERA HOUSING	Includes oscilloscope bezel adapter ring, viewing door with provision for monocular viewing, and shutter release cable.
3.	FILM TYPE	Polaroid Type 41, 42, 44, or 46L in eight-exposure rolls.
4.	PRINT SIZE	2-7/8 x 3-3/4 inches.
5.	OBJECT-TO-IMAGE RATIO	1 to 1
6.	LENS	Three-element 75 mm, apertures f/2.8 to f/22; or six-element 75 mm, apertures f/1.9 to f/16.

TABLE 1-1. TECHNICAL SUMMARY (Continued)

7. SHUTTER SELECTION

   a. f/1.9 lens ..... Time, bulb, 1 to 1/100 second.

   b. f/2.8 lens ..... Time, bulb, 1/25 to 1/100 second.

8. FOCUS AND IMAGE SIZE ..... Normally factory set; can be adjusted as described in the Instruction Manual.

9. OVER-ALL DIMENSIONS ..... Length: 13 inches
   Height: 9 inches
   Width: 9-1/2 inches

10. WEIGHT ..... 10 pounds

11. ACCESSORIES AVAILABLE

   a. Type 692: Positive Transparency Field Kit

   b. Type 2615: Mount for Graflex Accessories

   c. Type 2616: Roll Film Holder for #120 Film

   d. Type 2617: Package of Three Sheet Film Holders

   e. Type 2618: Viewing and Focusing Hood (for use with Type 2617)

   f. Type 2619: Film Pack Holder

   g. Type 2664: Film Development Timer

   h. Type 2669: Carrying Case for Type 353 Oscilloscope Camera

SECTION 2

OPERATION

2-1. MOUNTING THE TYPE 353 OSCILLOSCOPE CAMERA

a. GENERAL

Step 1. Loosen the knurled adapter ring knob farthest from the camera back.

Step 2. Slide the adapter clamp ring onto the oscilloscope bezel until it seats firmly against the bezel.

Step 3. Tighten the knurled adapter ring knob.

NOTE: The adapter clamp ring is factory positioned with respect to the camera housing so that the adapter clamp ring presses against the shoulder on the housing. The adapter clamp ring must be kept in this position to insure the correct distance between the lens and the cathode-ray tube. Adjustment to this position can be made by loosening the knurled adapter ring knob closest to the camera back.

b. HORIZONTAL MOUNTING (Figure 2-1)

To take advantage of the larger dimension of the rectangular print of the Polaroid camera, the Type 353 is usually mounted as shown in Figure 2-1. When so mounted, the sliding back feature is now from side-to-side since the film's long dimension is parallel to the horizontal sweep.

c. VERTICAL MOUNTING (Figure 2-2)

To photograph several traces on each frame of film, it is recommended that the entire Camera be rotated 90° to the vertical position as shown in Figure 2-2. Now the camera back can be positioned vertically to record several traces on the same print. The scale shown on the camera mounting plate permits even spacing of each trace, while three detent points (at the longer lines on the scale) indicate positively three equally spaced positions.

2-2. LOADING THE CAMERA

Instructions for loading the camera are given in Figures 2-3 through Figures 2-11, inclusively.

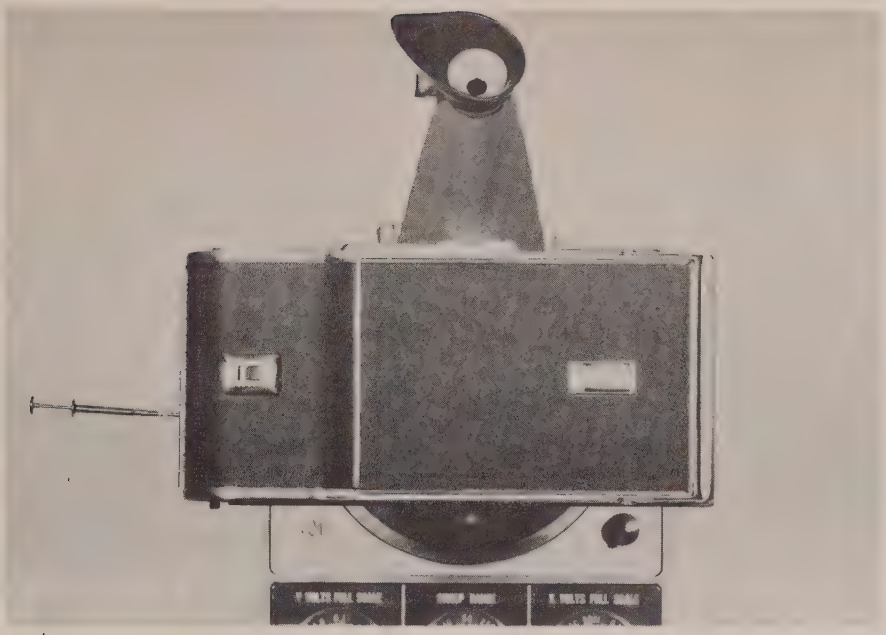


FIGURE 2-1. HORIZONTAL MOUNTING

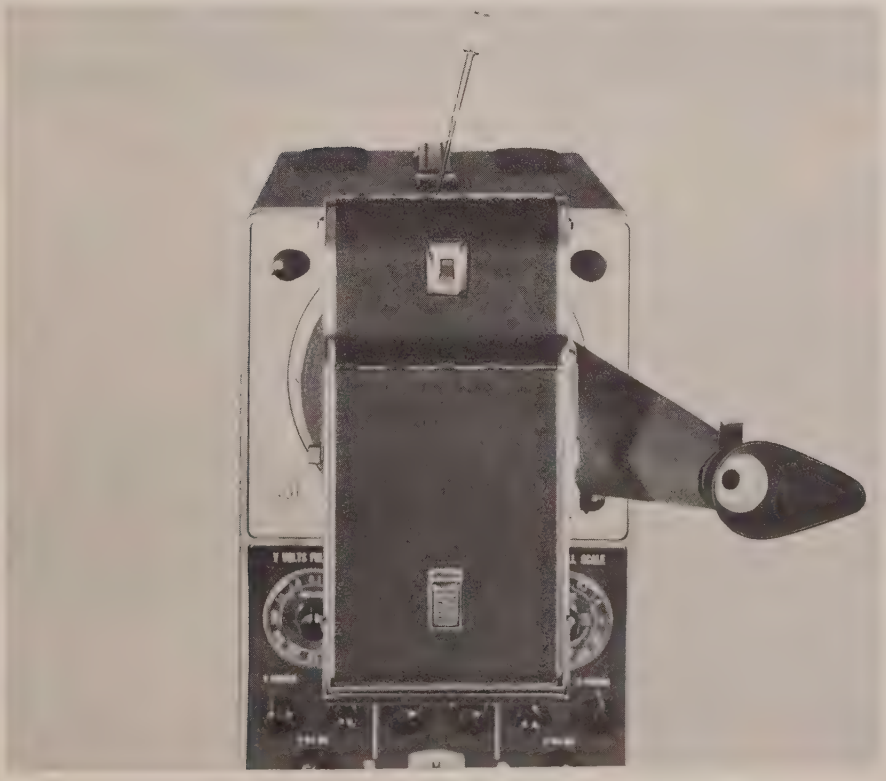
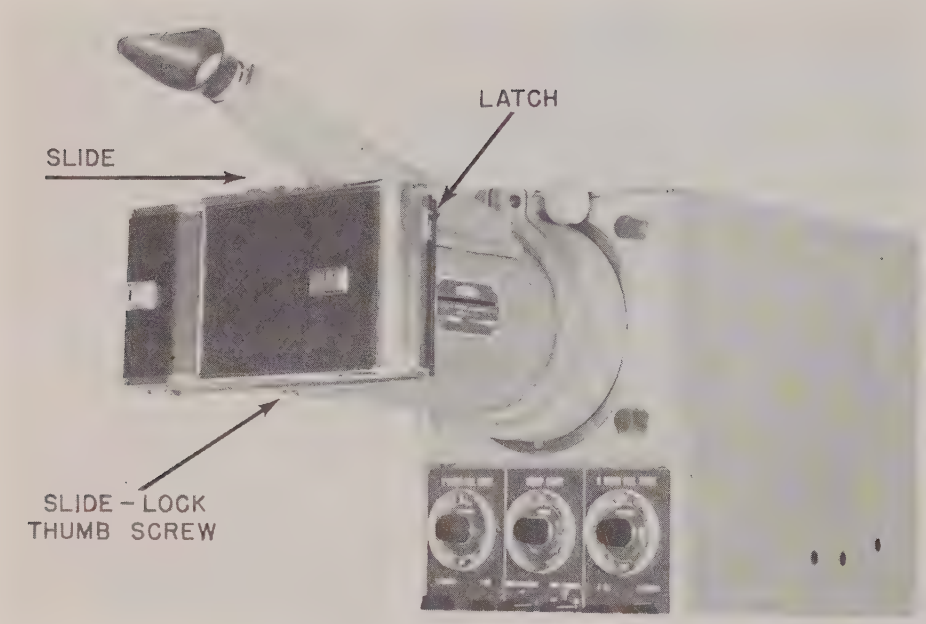
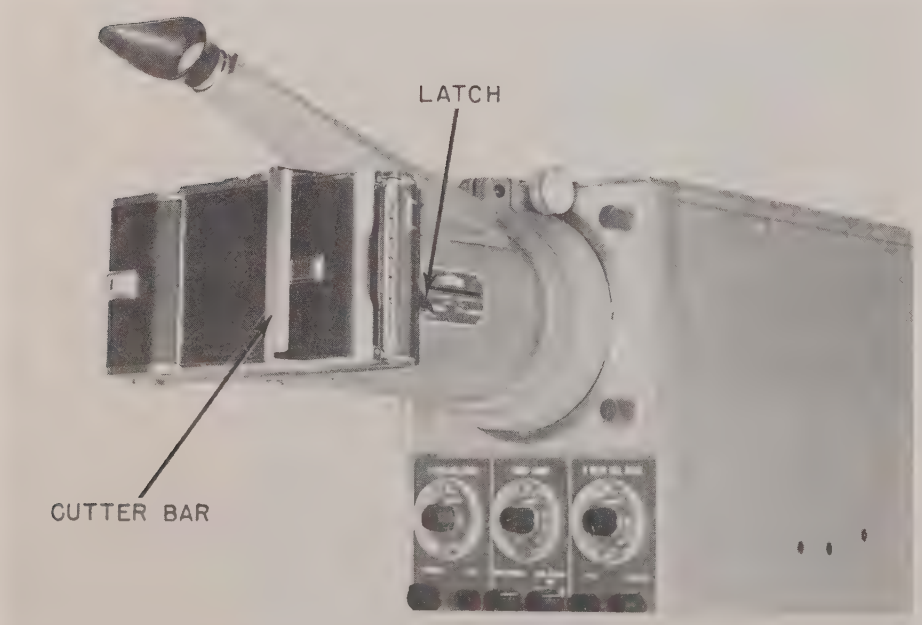


FIGURE 2-2. VERTICAL MOUNTING



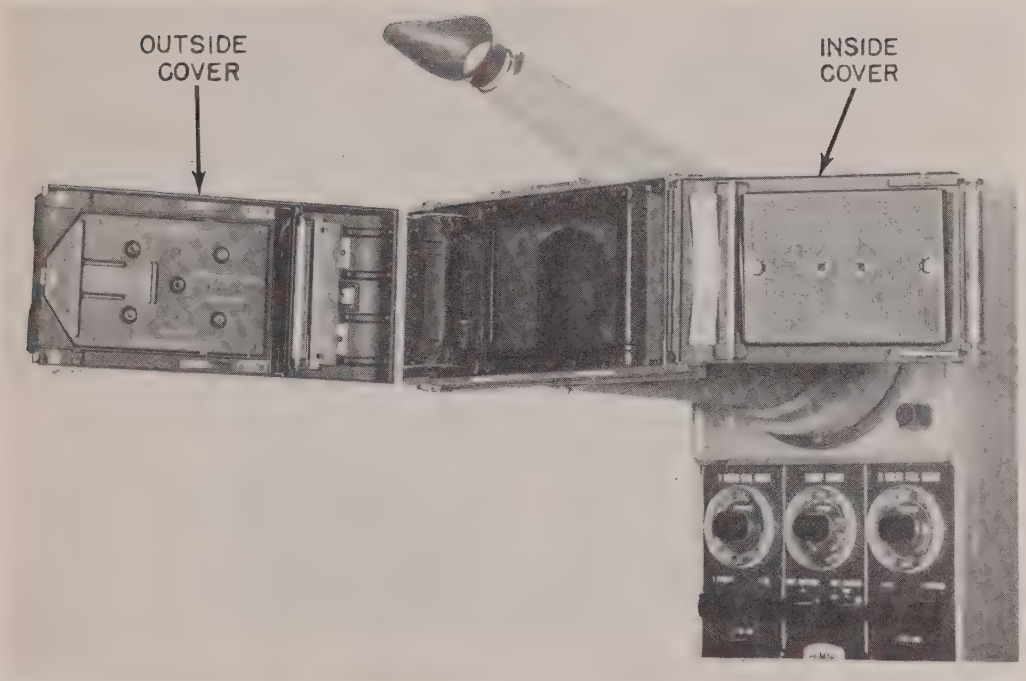
SLIDE TO EXPOSE LATCH.

FIGURE 2–3. LOADING PROCEDURE, STEP 1



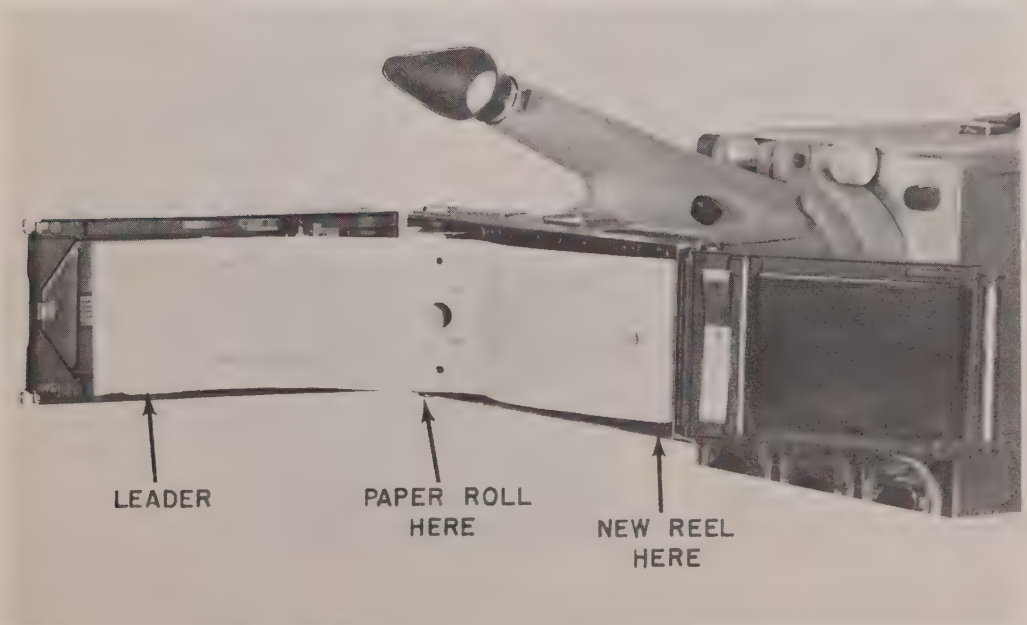
LIFT CUTTER BAR
UNLOCK COVER
USING LATCH.

FIGURE 2–4. LOADING PROCEDURE, STEP 2



OPEN COVERS.

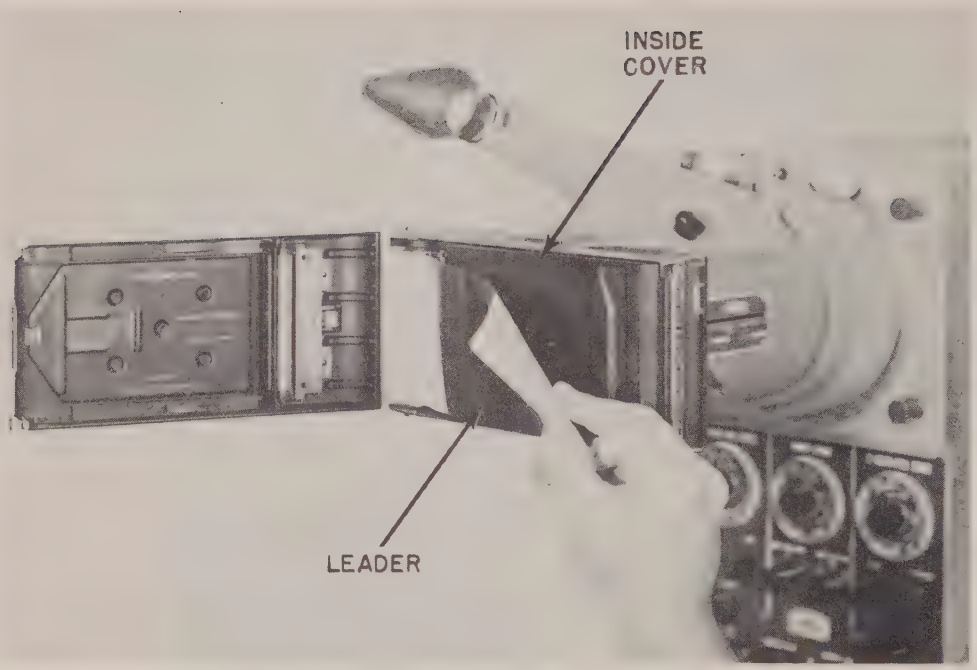
FIGURE 2-5. LOADING PROCEDURE, STEP 3



DISCARD OLD REEL.

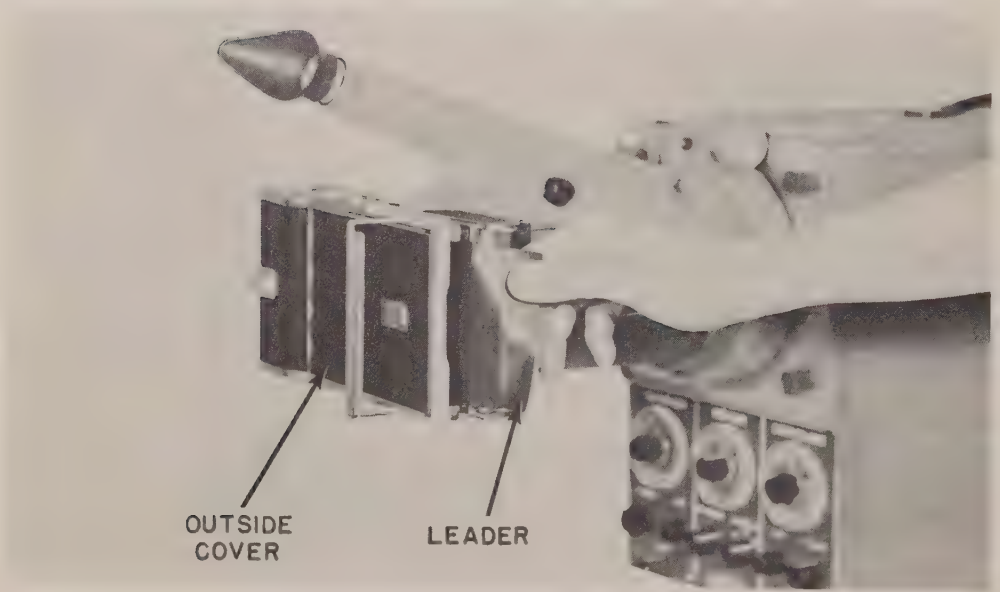
INSERT FILM.

FIGURE 2-6. LOADING PROCEDURE, STEP 4



CLOSE INSIDE COVER, FOLD LEADER OVER.

FIGURE 2-7. LOADING PROCEDURE, STEP 5



CLOSE OUTSIDE COVER, LEADER OUT.

FIGURE 2-8. LOADING PROCEDURE, STEP 6

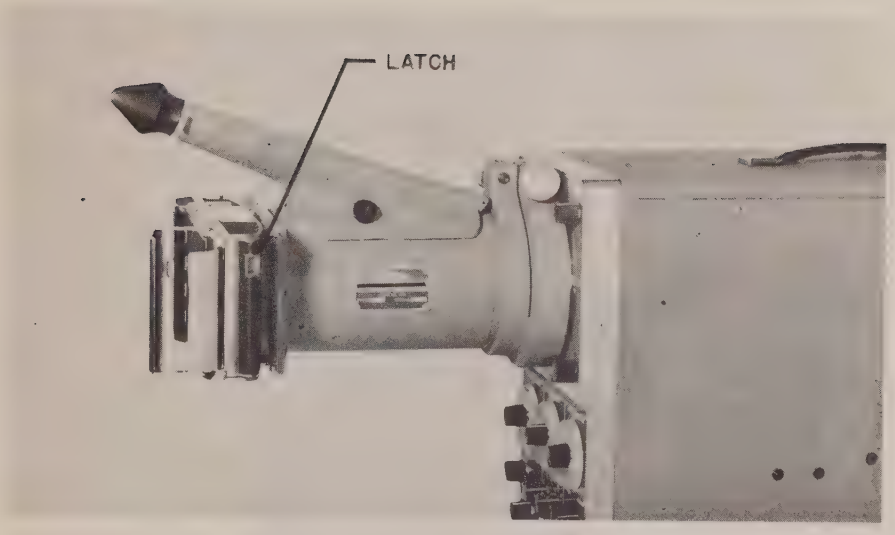


FIGURE 2-9. LOADING PROCEDURE, STEP 7

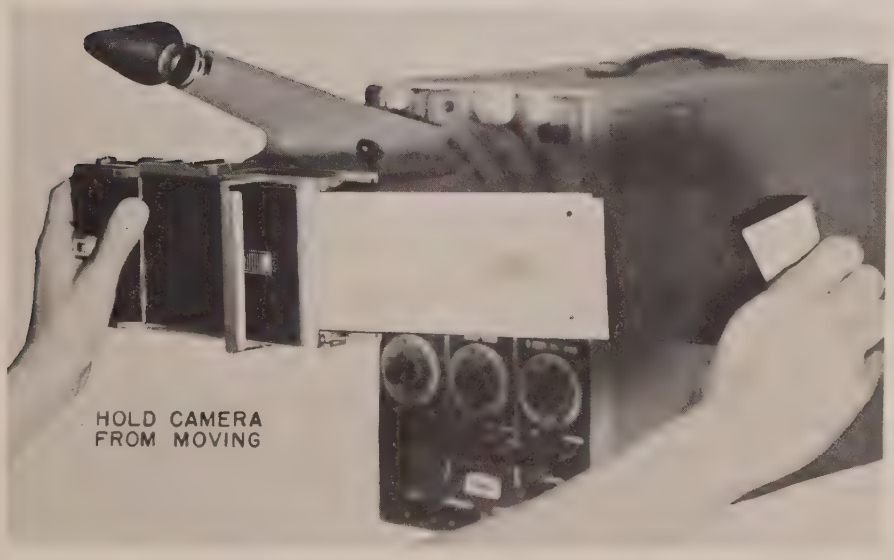
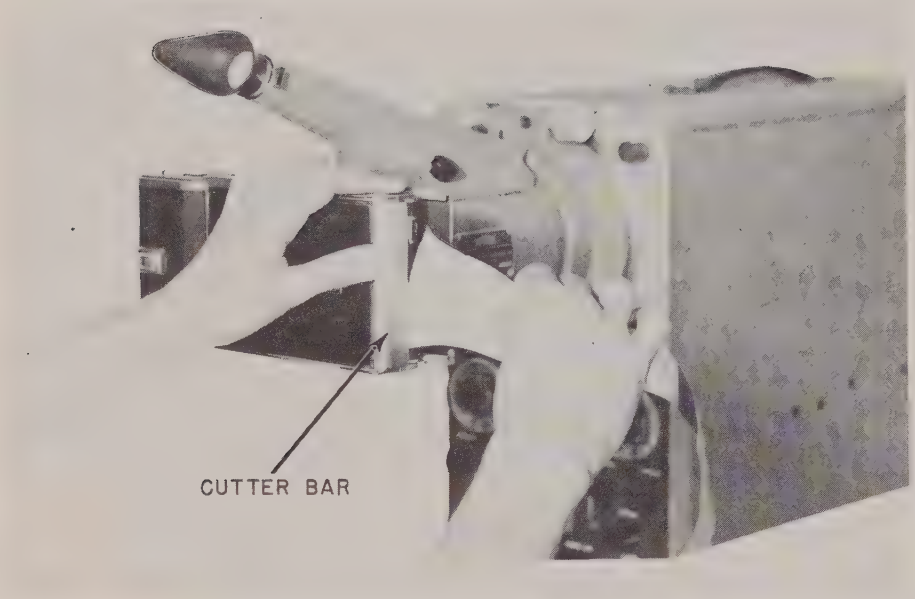


FIGURE 2-10. LOADING PROCEDURE, STEP 8



FIRST PICTURE IS NOW IN PLACE
FOR EXPOSURE WHEN DESIRED.

FIGURE 2-11. LOADING PROCEDURE, STEP 9

2-3. EXPOSURE DETERMINATION

A few of the factors which affect the setting of the iris diaphragm and which determine the exposure time interval are:

1) The over-all accelerating potential of the oscilloscope.

2) The actual brightness setting of the oscilloscope.

3) The amplitude of the pattern on the cathode-ray tube screen.

4) Whether the pattern is a single transient or repetitive.

5) Sweep repetition rate.

6) Whether the pattern is stationary, jittery, or drifting.

7) The number of cycles appearing on the screen.

8) The age of the particular cathode-ray tube.

9) The type of screen phosphor.

It is therefore recommended that test pictures be taken to determine the most useful settings for the f-stop and the shutter exposure time.

2-4. TAKING THE PICTURE

Visual observation of the complete oscilloscope trace is possible through the lens access door on top of the camera housing. Monocular viewing of a 2-inch vertical by 4-inch horizontal section of the cathode-ray tube about the center is accomplished with the door closed and by looking through the rubber shield with the slide in the eye piece open. This permits simultaneous viewing and picture taking under normal ambient lighting conditions.

Step 1. Set the camera in position as suggested in paragraph 2-1: horizontal for full use of the film frame, vertical for multiple exposure of one frame. Remember that when several exposures are to be taken on one frame, the signal deflection should be kept low enough to avoid overlapping of traces.

Step 2. To open the lens access door, rotate the doorknobs counterclockwise about 1/4 turn.

Step 3. Set the shutter exposure time by rotating the knurled ring to the desired speed setting.

Step 4. Set the iris diaphragm by sliding the pointer, located on the lens assembly, to the desired "f" number.

Step 5. Close the lens access door and rotate the door-knobs about 1/4 turn clockwise to tighten.

NOTE: It is recommended that test pictures be taken to determine the most useful settings for the f-stop and the shutter exposure time.

Step 6. Squeeze the shutter release to take the picture.

Step 7. If more than one picture is to be taken on the same frame, release the knurled screw and slide the camera body to the next detent or in between as desired.

2-5. PROCESSING THE EXPOSED PICTURE

Instructions for processing the film are given in Figures 2-12 through 2-16, inclusively.

2-6. REPRODUCTION OF POLAROID-LAND PRINTS

The Polaroid-Land process ordinarily does not yield a negative suitable for reproduction as in the conventional photographic process. The common procedure for obtaining reproductions is to have the print photo-copied; the new negative is then used to make the desired number of prints. It is possible, however, to fix permanently the original paper negative. The following procedure is recommended:

Step 1. Make the recording and commence the processing as outlined elsewhere in this section.

Step 2. Approximately one minute after starting the processing, place a black cloth over the top of the camera, and open the picture door.

Step 3. Peel off the print and immediately close the picture door. The paper negative of this print remains in the camera and will not fog as long as it is not exposed to light.

Step 4. When starting the processing of the next print, pull the paper negative of the previous print out (under cover of a black cloth or in a darkened room); tear off the paper negative and immediately immerse it in a hypo solution.

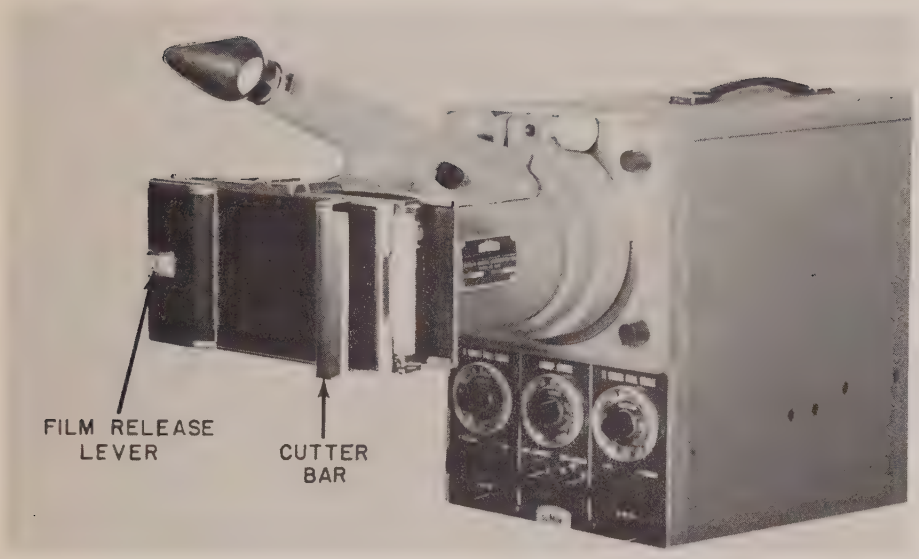


FIGURE 2-12. DEVELOPING PROCEDURE, STEP I

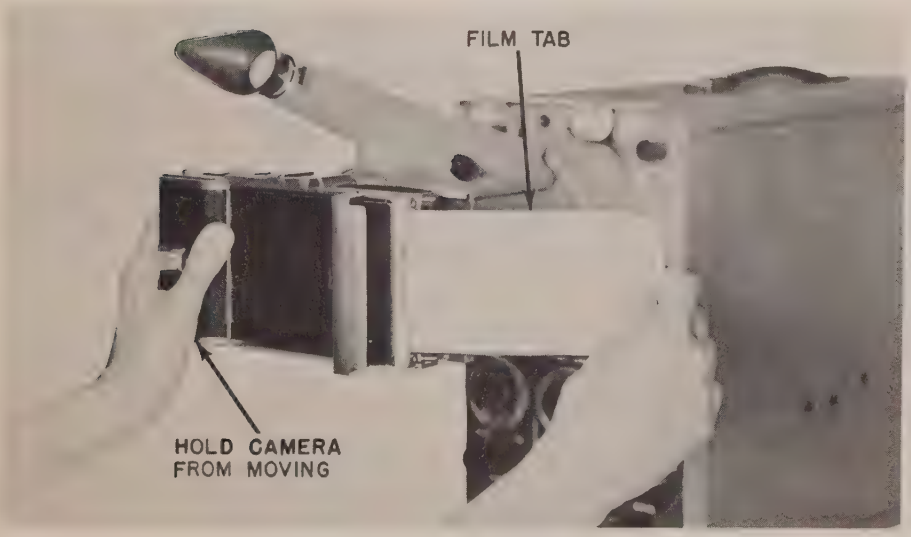


FIGURE 2-13. DEVELOPING PROCEDURE, STEP 2

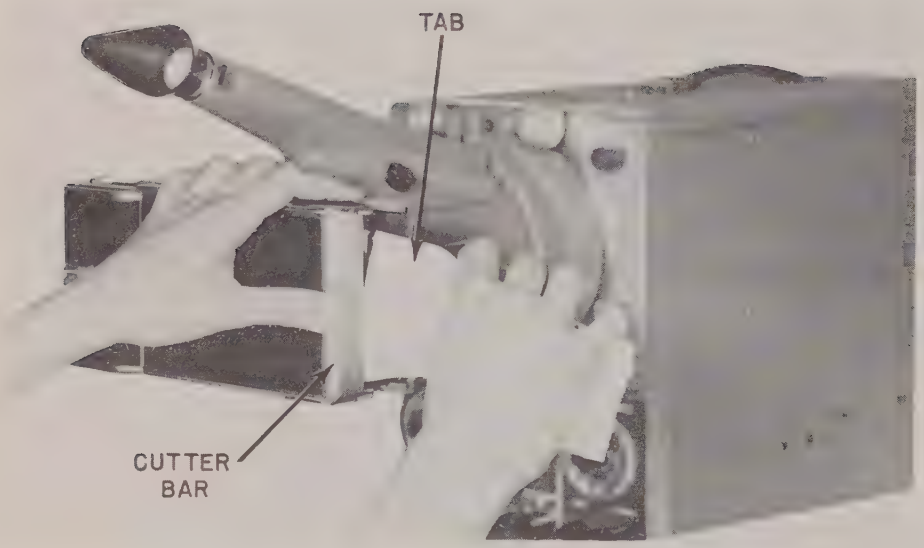


FIGURE 2-14. DEVELOPING PROCEDURE, STEP 3

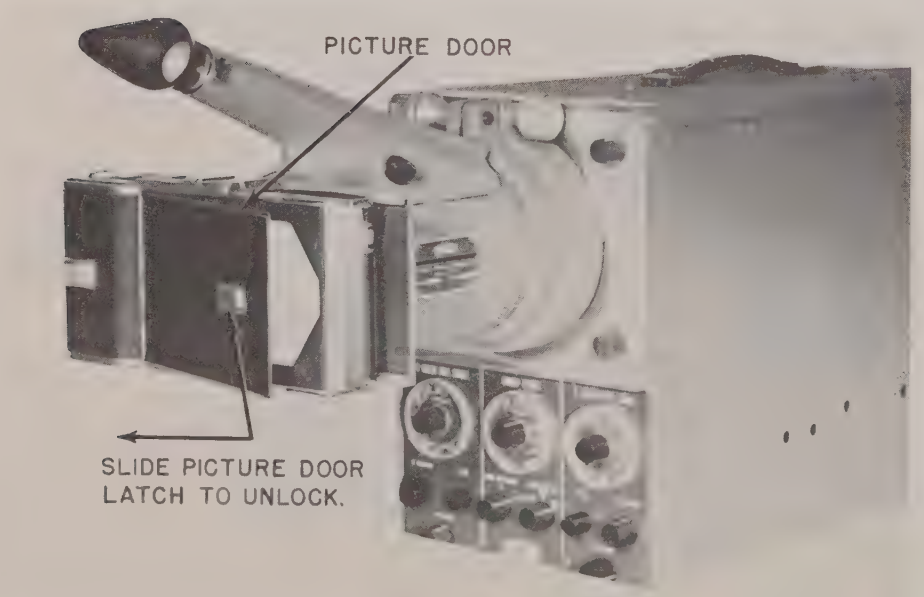

PICTURE DOOR
SLIDE PICTURE DOOR LATCH TO UNLOCK.
FOR DEVELOPING ACTION, WAIT 60 SECONDS, THEN OPEN PICTURE DOOR.
NOTE: FOR 46L FILM, WAIT 120 SECONDS.

FIGURE 2-15. DEVELOPING PROCEDURE, STEP 4

PICTURE IS LIFTED OUT BY TEARING ALONG PERFORATIONS. HANDLE PRINT BY EDGES ONLY.

FLATTEN PRINT BY DRAWING OVER TABLE EDGE, THEN COAT USING APPLIER PROVIDED WITH FILM.

REPEAT EXPOSURE AND DEVELOPING PROCEDURES UNTIL ROLL IS USED UP, THEN RELOAD ACCORDING TO INSTRUCTIONS PROVIDED.

FIGURE 2-16. DEVELOPING PROCEDURE, STEP 5

Step 5. Leave the paper negative in the hypo solution for approximately two minutes; meanwhile the next exposure can be made. A concentrated hypo solution is recommended.

Step 6. After fixing, the paper negative may be washed and dried in the usual manner.

Step 7. Print the paper negative by placing its emulsion side in contact with the emulsion of the printing paper and exposure through the negative. Process the print in the ususal manner.

To improve the appearance of the print, rub the back of the paper negative with oil, vaseline or melted wax to render it more translucent, this facilitates the transmission of light through the paper negative for contact printing.

In a similar manner the Polaroid print itself may be reproduced. However, in this case, a contact negative will result. Advantage can be taken of this effect by contact-printing the Polaroid print on a sheet of negative material for subsequent use in making any desired number of positive duplicates.

NOTE: The above steps can be eliminated and a positive transparancy can be produced directly by using 46L film.

2-7. PRESENSITIZING POLAROID-LAND FILM

The available Polaroid-Land recording material is not as fast as conventional film for photographing high-writing speeds. It is possible to greatly increase the actual photographic writing speed of the Polaroid material by presensitizing the emulsion before the pictures are made. The recommended procedure is as follows:

Step 1. Load the film into the camera

Step 2. Set up the camera against a sheet of white opal glass.

Step 3. About six inches away from the face of the opal glass, place a 25-watt frosted incandescent lamp; turn on the lamp.

Step 4. Expose for 1/25 of a second at f/2.8. An increase of maximum photographic writing speed by as much as eight times can often be obtained.

SECTION 3

MAINTENANCE

3-1. GENERAL

The Type 353 Oscilloscope Camera should be handled with the same care given to all fine optical equipment. Under no circumstances should an attempt be made to force-fit parts.

The focus should not be readjusted unless there is reason to believe from observing recordings that the camera is out of focus.

For the majority of the work, the depth of field of the lens is sufficient to accommodate curved-face cathode-ray tubes with the aperture wide open or with screens and filters inserted between the camera housing and cathode-ray oscillograph screen.

For any servicing beyond the obvious simple repairs, it is recommended that the Camera be returned to the Instrument and Automotive Equipment Service Department, Allen B. Du Mont Laboratories, Inc., 35 Market Street, East Paterson, New Jersey.

3-2. PREVENTIVE MAINTENANCE

a. LENS AND SHUTTER

The lens and shutter mechanisms have been carefully inspected at the factory. Should they become defective at any time, the entire camera should be returned to the factory for repair. Shutter repairs should not be attempted except by experienced camera technicians.

It may occasionally be necessary to remove dust particles from the surfaces of the lens. These surfaces should be cleaned by dusting with a soft camel hair brush. The use of a lens cap is recommended.

b. LUBRICATION

This equipment requires no lubrication. NEVER OIL OR LUBRICATE THE SHUTTER MECHANISM.

c. STORAGE

When the camera is not in extended use it is suggested that it be stored in a carrying case or covered with a plastic bag.

3-3. REFOCUSING

The lens of the camera has been set at the factory to be in optimum focus and at an object to image ratio of 1:1 when the camera housing shoulder is pressed against the adapter clamp ring and the ring is seated firmly against the oscilloscope bezel.

If refocusing is necessary, proceed as follows:

1. Mount the camera on the oscilloscope horizontally (See Figure 2-1).

2. Open and lay back the outside and inside covers of the camera.

3. Place a sheet of 3-3/8" by 4-1/4" ground glass over the film aperture with the frosted side toward the lens.

4. Open the lens access door; set the shutter for "time" exposure and the iris diaphragm to the smallest "f" number (largest lens opening).

5. Close the lens access door; set the oscilloscope to obtain a sharply focused stationary pattern, two inches in amplitude, and centered on the cathode-ray tube screen.

CAUTION

To prevent damage to the screen of the cathode-ray tube, observe the pattern through the peep hole while making intensity adjustments. Keep intensity low.

6. Depress the shutter release button to open the shutter and observe the oscilloscope pattern on the ground glass. If the image is not sharp or if it is not the same size as the pattern on the oscilloscope, it will be necessary to change the lens and camera back positions.

NOTE: When a change is made in the focus, the image size may also be affected; likewise the focus may be affected when a change is made in the image size. Therefore, both may have to be checked and reset at the same time. When precise ratio or focus is not required, a single adjustment of the lens or the camera back may be all that is required.

7. Adjust the lens by loosening the two lens setscrews located on the lens support inside of the camera housing (Figure 3-1) and by loosening the two screws holding the shutter-release-cable sliding plate so that it can move freely on the camera housing with the movement of the lens.

8. The camera back is moved by loosening the two setscrews in the camera housing that hold it in position (Figure 3-2).

   NOTE: These setscrews prevent camera back rotation and limit the travel of the camera back by sliding in grooves in the adjustment sleeve and must NOT be loosened so that they are out of the grooves.

9. It will be found that moving the camera back away from or toward the object (pattern on oscilloscope) will primarily affect the sharpness of the image (focus) on the ground glass plate; while moving the lens assembly away from or toward the object will primarily affect the image size.

   NOTE: If desired, when using the Polaroid camera back, the object to image ratio of the camera can usually be adjusted to be more than 1:1 in order to record a full horizontal trace. This is accomplished by obtaining such a trace on the oscilloscope and moving the lens assembly away from the object until the entire trace is seen and in focus on the ground glass plate, unless the lens assembly reaches the limit of its travel before the full trace is visible.

10. After the focus and image size have been set, tighten the three sets of screws mentioned above.

3-4. CHANGING THE LENS ASSEMBLY

Cameras that are normally supplied with a f/2.8 75-mm lens may in some instances need to be replaced with a f/1.9 75-mm lens. To make this, proceed as follows:

1. Open the lens access door.

2. Loosen the two lens setscrews located on the lens support inside of the camera housing (Figure 3-1).

3. Unscrew the shutter release cable by loosening the two screws holding the shutter-release-cable sliding plate.

4. Take out the entire lens assembly and replace it with the new one.

5. Replace the shutter release cable.

6. Refocus the camera as outlined in paragraph 3-3 and tighten the three sets of screws mentioned above.

3-5. REPLACEMENT PARTS (Figures 3-1 & 3-2)

The accompanying photographs show the Du Mont Part Numbers and the names of all replaceable parts.

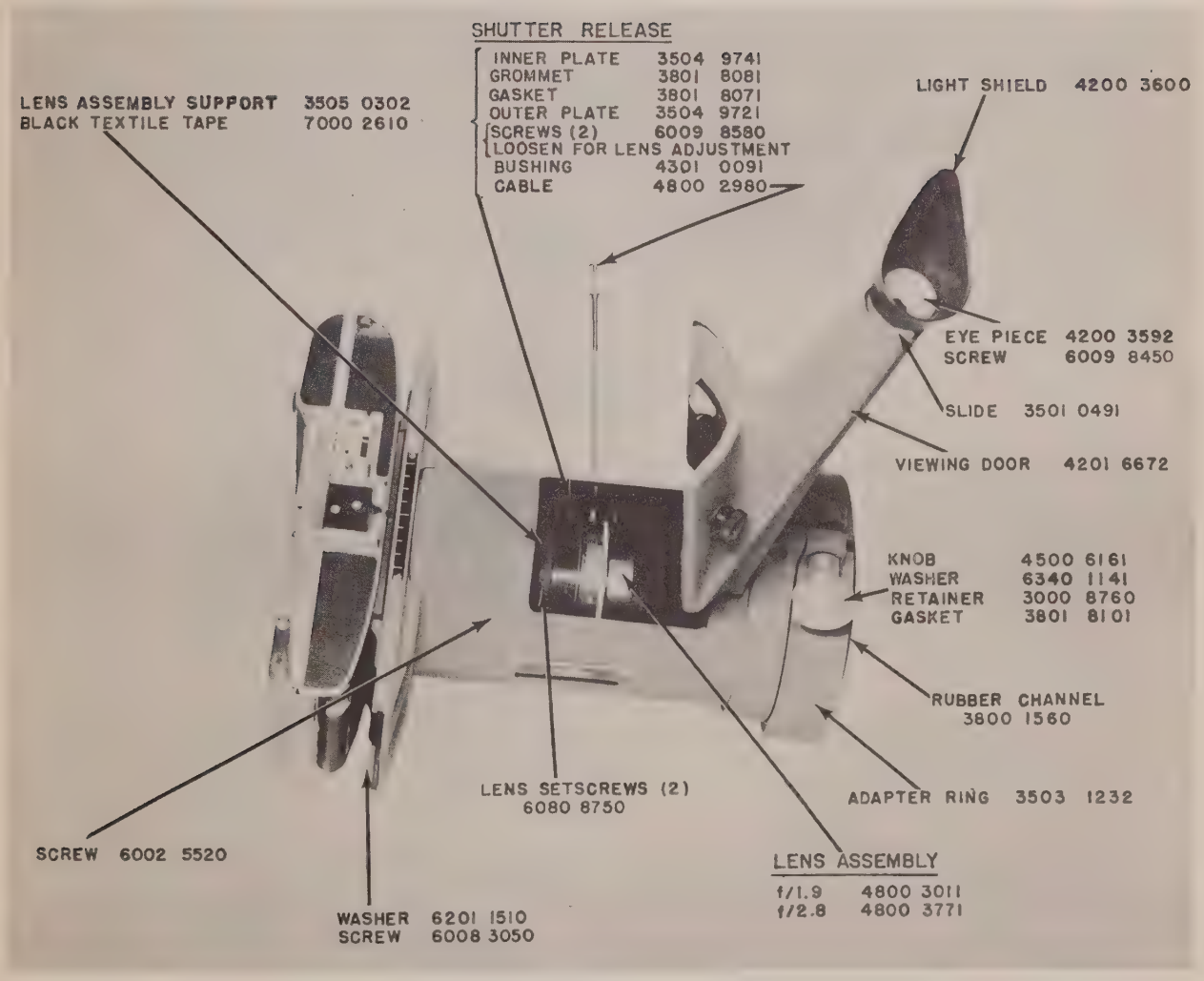


FIGURE 3-1. IDENTIFICATION OF REPLACEABLE PARTS,
OVER-ALL VIEW

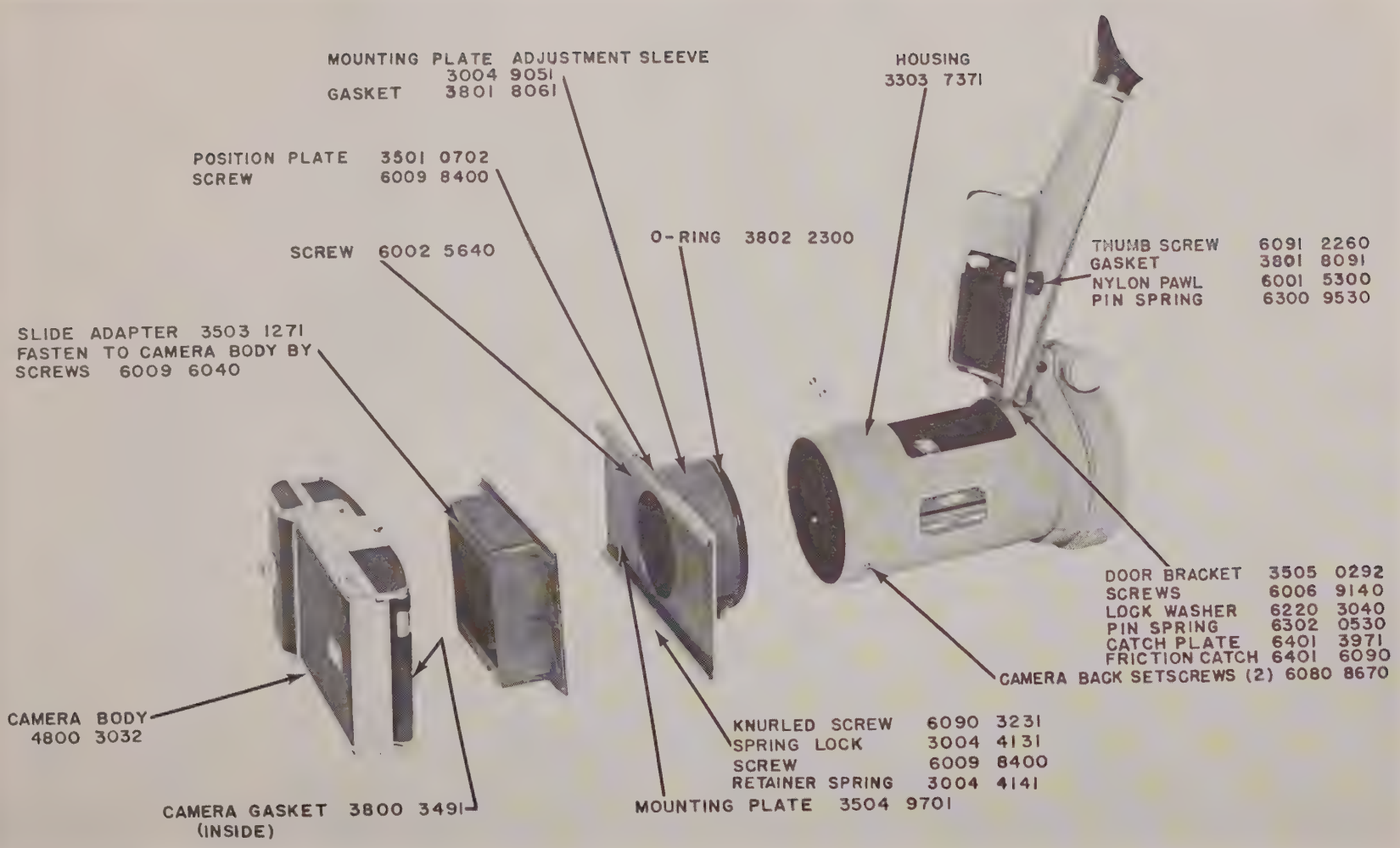


FIGURE 3-2. IDENTIFICATION OF REPLACEABLE PARTS, SEMI-EXPLODED VIEW

WARRANTY AND SERVICE NOTICE
for
Industrial Type Cathode-ray Tubes and Instruments

DU MONT INSTRUMENTS

Each instrument manufactured by the Technical Products Division of Allen B. Du Mont Laboratories, Inc., is guaranteed to equal or exceed its published performance specifications. It is further guaranteed against defective materials (other than the cathode-ray tube) and workmanship for a period of one year from delivery date. Any defective instrument or an instrument that does not meet or exceed our specifications will, upon inspection by us, be repaired or replaced at our discretion should such defect appear within the guarantee period.

To register this guarantee, the enclosed guarantee card must be properly filled out and mailed to the factory immediately upon receipt of the equipment. Complete information is necessary. BOTH THE TYPE NUMBER AND THE SERIAL NUMBER OF THE INSTRUMENT MUST BE GIVEN ON THIS CARD.

Instruments must be examined immediately upon receipt, since claims for damage in transit will not be honored by the carrier unless prompt action is taken.

DU MONT CATHODE-RAY TUBES

Industrial type cathode-ray tubes manufactured by Allen B. Du Mont Laboratories, Inc., are guaranteed for 1000 hours of operation or for a six-month period from date of shipment, whichever expires first. Adjustments will be made on the merit of each individual claim because of the widely varying applications to which such tubes are subjected, and a tube which becomes defective during the guarantee period will be replaced ONLY AFTER INSPECTION AT THE FACTORY. Cathode-ray tubes returned under the guarantee, must be shipped with transportation paid.

BURNED-OUT HEATERS AND BROKEN GLASS ARE NOT COVERED BY THE TUBE GUARANTEE

To register a tube guarantee, the guarantee card enclosed with the tube must be filled out properly and mailed to the factory immediately upon receipt of the equipment. Complete information is necessary. TYPE NUMBER AND SERIAL NUMBER OF THE CATHODE-RAY TUBE MUST BE INCLUDED. The serial number of the tube will be found either on the glass stem of the electron-gun structure or on the bulb near the Du Mont brand. Tubes must be examined immediately upon receipt, since claims for damage in transit will not be honored by the carrier unless prompt action is taken.

CHANGES IN SPECIFICATIONS

The right is reserved to change the published specifications of equipment at any time and to furnish merchandise in accordance with current specifications without incurring any liability to modify equipment previously sold, or to supply new equipment in accordance with earlier specifications excepting under the classification of special apparatus.

SERVICE

In order to insure factory service under our guarantees, the guarantee cards enclosed with all instruments and tubes must be properly filled out and returned. In all cases where service or adjustment is requested, please write first to the factory giving complete information concerning the nature of the failure and describing the manner in which the equipment was used when failure occurred. THE TYPE NUMBER AND SERIAL NUMBER of the equipment must also be given. In this way, much time can be saved and unnecessary inconvenience often avoided. When writing in this respect, address:

Allen B. Du Mont Laboratories, Inc.
Instrument Division
760 Bloomfield Avenue, Clifton, New Jersey

The Technical Products Division will then send to the customer, the written procedure for sending the instrument back to the factory. All equipment should be packed and shipped in accordance with this procedure; and identification tags should be attached to each tube or instrument.

REPLACEMENT PARTS

If it is necessary to order a replacement component from the factory, always give the type number and serial number of the instrument and refer to the component by its symbol designation and description on the circuit schematic. This will help to expedite service.

DUMONT®

Additional copies of this manual may be secured at a cost of one dollar and fifty cents each; postpaid in the United States of America only.

Allen B. DuMont Laboratories, Inc.
INSTRUMENT DIVISION
760 BLOOMFIELD AVENUE, CLIFTON, N. J., U. S. A.